

“The Searchers” Finding a Sustainable Raw Water Supply for Salina



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City of Salina, Kansas

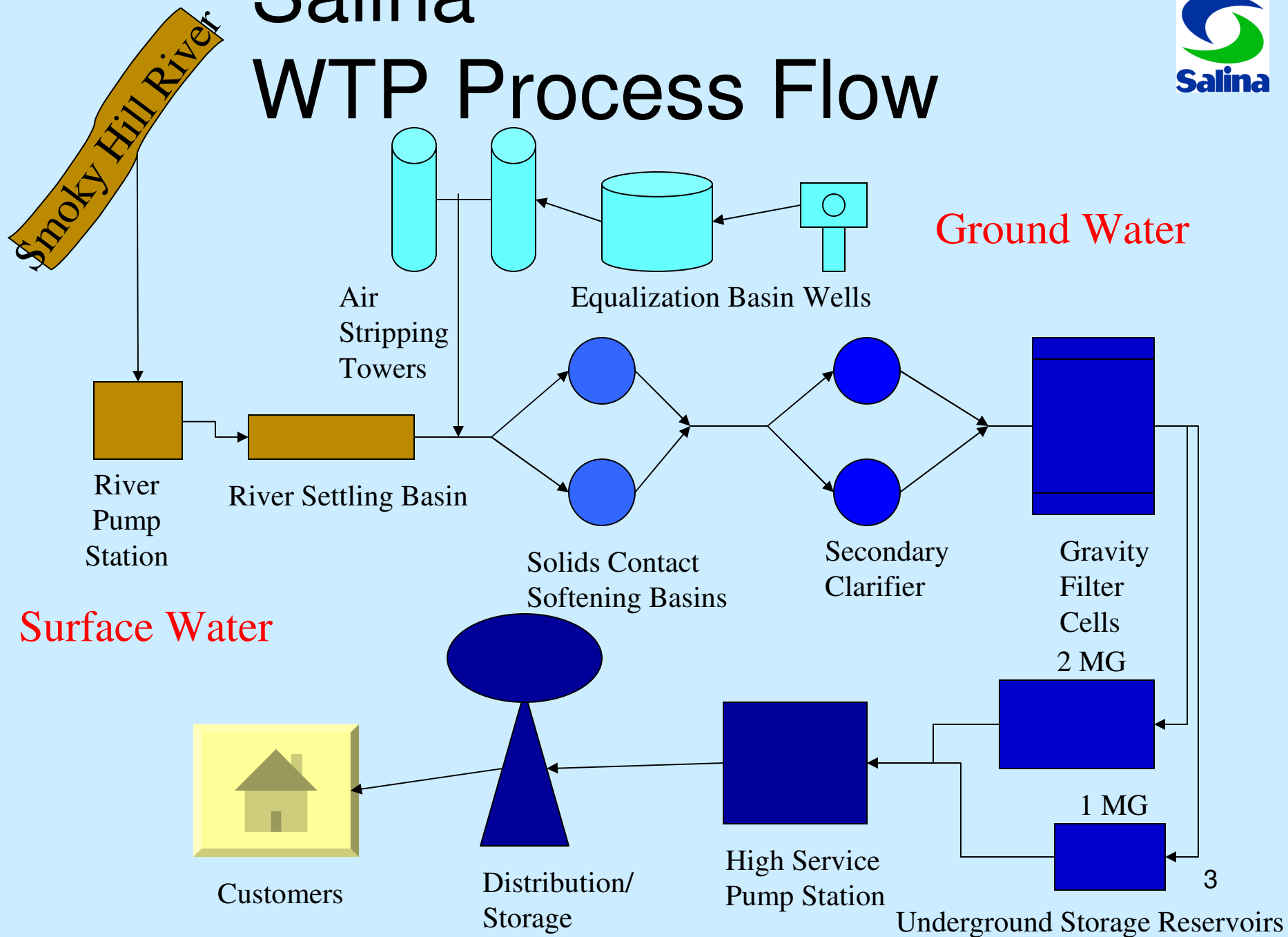
September 2, 2009



Topics

- **Salina's Water System**
- **Water Emergency of 2006**
- **Groundwater Contamination**
 - **North Central Salina Area**
 - **Former Schilling Air Force Base Area**
- **Raw Water Supply Study**
 - **Consultant Selection**
 - **Alternatives Process**
 - **Capital Improvement Plan**

Salina WTP Process Flow

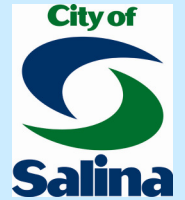


Water Emergency of 2006



- **July 17, 2006**
 - City consumption of 12.1 mgd
 - River flow – 19 cfs (12.2 mgd)
- **July 20, 2006**
 - Closed flood control gate to bypass channel
 - Division of Water Resources (DWR) preliminary assessment of irrigation uses along river between Kanopolis Lake and Salina
 - River flow- 9 cfs (5.8 mgd)
- **July 21, 2006**
 - Water Watch declared
 - City consumption of 9.7 mgd
 - River flow = 7.7 cfs (4.9 mgd)
- **July 26, 2006**
 - Water Emergency declared
 - City consumption of 11.5 mgd
 - River flow 3.2 (2.0 mgd)

Water Emergency of 2006



- **July 27, 2006**
 - City requested DWR administer water rights
 - City consumption 7.1 mgd
 - River flow 1.3 cfs (0.83 mgd)
- **July 31, 2006**
 - Downgraded Water Emergency to Water Warning
 - City consumption of 7.3 mgd
 - River flow 17 cfs (10.9 mgd)
- **Aug. 3, 2006**
 - River water flowing over dam at river intake structure
 - Increased river water pumps to 7.5 cfs (4.8 mgd)
- **Aug. 4, 2006**
 - DWR administering water rights to irrigators along the river
- **Aug. 31, 2006**
 - DWR rescinded legal notice, signifying out of administration of water rights

Groundwater Contamination North Central Salina Area



- **Consent Agreement (KDHE & City) – Late 1990's (South 2/3 of Wellfield)**
 - Treatment of public water supply to address contamination from dry cleaning facilities and underground storage tanks
 - Air strippers installed at the Water Treatment Plant

<u>Contaminate</u>	<u>Influent (ppb)</u>	<u>Effluent (ppb)</u>
• Benzene	200	0.5
• Tetrachloroethylene (PCE)	200	0.5
• Trichloroethylene(TCE)	25	0.5
• Carbon Tetrachloride	2	0.5
• 1,2 Dichloroethane (1,2 – DCA)	4	0.5

Groundwater Contamination North Central Salina Area



- **North 1/3 of Wellfield (Wells 11, 12, 15 & 16)**
 - **Primary Contaminants**
 - **Carbon Tetrachloride**
 - **1,2 – Dichloroethane (1,2 – DCA)**
 - **Pumped minimally to avoid moving the plume**
 - **1,2 DCA detected in Well 11 with concentrations of up to 29.5 ppb**
 - **1,2 DCA main source is 501 N. Santa Fe Site**
 - **Remediation is in place: soil vapor extraction, air-sparge and recovery wells**
 - **Contaminant transport model predicts:**
 - **100 ppb at Well 11 within 5 years**
 - **10 ppb at Well 12 within 5 years**
 - **Responsible party to pay for remediation to protect the public water supply**
 - **On-line VOC Analyzer**

Groundwater Contamination

Former Schilling Air Force Base Area



- In operation 1942 – 1967 and closed in 1965
- Military responsible for contamination
- U.S. Army Corps of Engineers (CORP) responsible for cleanup
- Contamination is trichloroethylene (TCE)
- Chemical used in solvents during and following WWII (grease removal from metals)
- 20 years & millions of dollars in studies & testing
- Public Entities: Salina, K-State at Salina, Salina Public Schools (USD 305) and Salina Airport Authority have united in an effort to accelerate cleanup
- Entities negotiating with CORP (lump sum settlement/local control of the cleanup)
- TCE doesn't appear to pose immediate health threats. Groundwater plume moving northeast towards the City's public water supply wells. 1.4 miles to Well No. 5
- Estimates range from 7 to 75 years before the TCE reaches Well No. 5
- Continually monitor area to determine what is happening underground

2006 KWO & KDHE Drought Vulnerable for Region 7- Large Public Water Suppliers



Basic Source Limitation

The supplier's primary raw water source is particularly sensitive to drought as evidenced by depleted streamflow, depleted reservoir inflow and storage, or by declining water levels in wells. Restrictions imposed due to inability to use a well(s) due to water quality problems were considered indicative of a basic source limitation.

Region 7

Drought Vulnerability

- None
- ★ Basic Source
- Distribution System

Source: 2006 KWO Drought Vulnerable List

Consultant Selection Process



- **Letter of Interest Sent**
 - 13 Engineering Consulting Firms
- **Selection Team**
 - 5 City of Salina Staff Members
 - Director of Utilities
 - Water Treatment Plant Superintendent
 - Water Treatment Plant Supervisor
 - Deputy City Manager
 - Civil Engineer
- **Returned Letters of Interest/Statement of Qualifications**
 - 7 Engineering Consulting Firms
- **Interviewed**
 - 3 Engineering Consulting Firms
- **Selected HDR/Wilson & Company/Layne Christensen**

Project Meetings

- **1 – Regulatory Meeting**
- **7 – Citizen's Advisory Board Meetings**
- **3 – Presentations to the City Commission**

Citizen's Advisory Board



- **Dan Ade – Landscaper**
- **Todd Anderson – Civil Engineer**
- **Gina Bell – Zoning Administrator**
- **Robert Bostater – Retired**
- **Beth Eisenbraun – Landscaper and chemist**
- **Tim Hobson – Environmental Consultant**
- **Don Hoff – Retired Engineer**
- **Mike Hulteen – Golf Course Superintendent**
- **Vernon Kennedy – Community Corrections Deputy**
- **Brian Kinnaird – Training Director for the SRS**
- **Harold Klaege – Executive Director, Kansas Alliance for Wetlands & Storms**
- **James Maes – Real Estate Agent**
- **Charles May – Retired Engineer**
- **John Ourada – Retired Engineer**
- **Lawrence Wetter – Retired Hydrologist/Engineer**

Citizen's Advisory Board Meetings



- **August 21, 2008**
 - Demand Projections
 - Existing Water Rights
 - Water Rights Related to Future Demands
 - Water Quality Summary
 - Potential Options for Supply
- **November 13, 2008**
 - Future Drinking Water Regulations
 - Review of Existing Sources of Supply
 - Optimization of Existing Sources
 - Regulatory Meeting
- **December 18, 2008**
 - TM2 Water Rights and Regulatory Review
 - TM3 Existing Sources of Supply
 - Water Conservation Plan
 - Water Reuse
 - Potential Water Conservation Measures
- **January 29, 2009**
 - Conservation
 - Water Reuse
 - New Sources of Supply
 - Alternatives Evaluation Criteria
- **February 12, 2009**
 - Alternatives Process
 - Preliminary Screening of Alternatives
 - Alternatives Evaluation Criteria
- **March 19, 2009**
 - Municipal Water Conservation Plan
 - Long-Term Water Use Efficiency
 - Drought/Emergency Response Plan
- **April 16, 2009**
 - Alternatives Selected for Final Evaluation
 - Alternatives Evaluation
 - Capital Improvement Plan

Regulatory Meeting

October 31, 2008



- **Purpose & Objectives**
 - Introduce the challenges and potential solutions to the regulatory agencies and receive big-picture feedback
 - Better understand area water rights and opportunities for acquisition of irrigation water rights
 - Understand future regulatory impacts related to conservation, water reuse, and new sources of supply that will affect the future of Salina's water supply
 - Understand the future availability of potential new sources of supply and the considerations that must be factored into the Raw Water Supply Study
- **Attendees**
 - City of Salina
 - Project Team (HDR, Wilson & Company, Layne Christensen)
 - Kansas Department of Health and Environment (KDHE)
 - Public Water Supply Section
 - Municipal Section
 - North Central District Office
 - Bureau of Remediation
 - Kansas Water Office (KWO)
 - US Army Corps of Engineers (USACE)
 - Division of Water Resources (DWR)
 - Kansas Farm Bureau

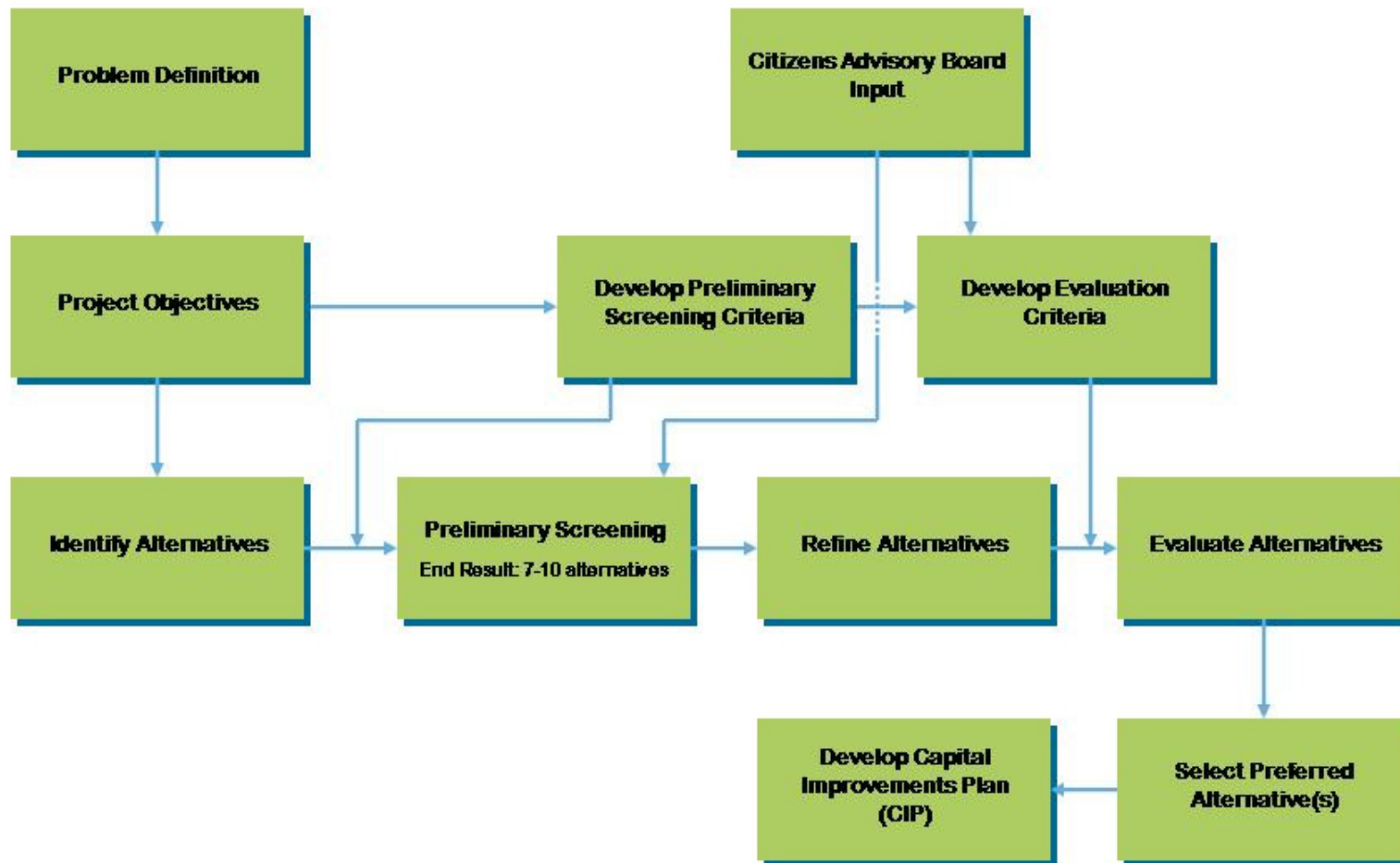
City Commission Meetings



- **December 8, 2008**
 - Presented a Summary the Raw Water Supply Study
 - Reviewed Work Completed
 - Demand Projections
 - Reviewed Water Rights and Regulatory Impacts
 - Reviewed Existing Sources of Supply
 - Citizen's Advisory Board
- **March 2, 2009**
 - Raw Water Supply Study Scope
 - Reviewed Work Completed
 - Conservation Plan
 - Water Reuse
 - Alternatives
 - New Sources of Supply
 - Alternatives Process
 - Preliminary Screening
 - Alternatives Evaluation Criteria
 - Future Plans
- **May 4, 2009**
 - Raw Water Supply Study Scope
 - Reviewed Work Completed
 - Review Alternatives Selected for Final Evaluation
 - Results of Paired Comparison Matrix
 - Results of Final Alternatives Evaluation
 - Capital Improvements Plan

Alternatives Process

- Systematic way to evaluate potential alternatives



Raw Water Supply Study



- **Problem Definition**
 - Strained ability of City to maintain adequate water supply
 - Decreased reliability of raw water supplies during drought conditions
 - Decreased flow in the Smoky Hill River
 - Decreased groundwater levels
 - Connectivity of groundwater and Smoky Hill River
 - Groundwater Contamination
 - Need water supplies to meet growing demands
- **Project Objectives**
 - Increase the reliability of raw water supplies, especially during drought conditions
 - Support economic growth and development
 - Optimize existing infrastructure
 - Minimize risks to the City and its customers
 - Cost effective solutions – “most bang for the buck”
 - Identify sustainable solution for next 50 years

Identification of Alternatives



- 1) Improvements at Downtown Wellfield
- 2) Improvements at South Wellfield
- 3) Seasonal surface water right
- 4) Kanopolis Reservoir *
- 5) Milford Reservoir *
- 6) Wilson Reservoir *
- 7) Saline River *
- 8) Confluence of Smoky Hill and Solomon Rivers *
- 9) Dakota Aquifer *
- 10) Construct a reservoir *
- 11) Acquire existing water rights *
- 12) Water Assurance District *

13) Aquifer recharge

- Infiltration ponds
- Direct recharge wells
- Infiltration through oxbow

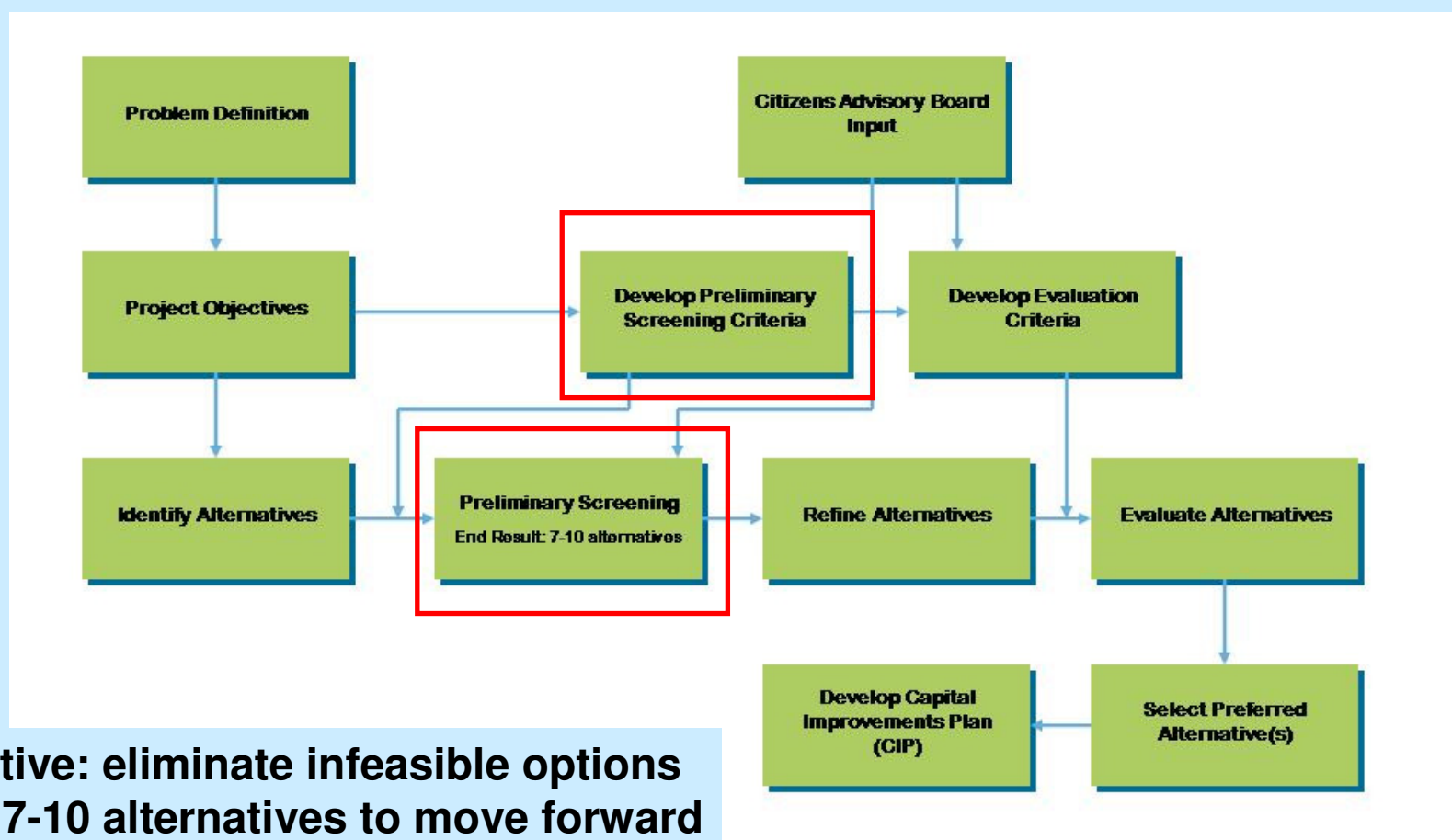
14) Water reuse

- All irrigation + industrial sites
- All irrigation sites
- City-owned irrigation sites

* New Sources of Supply

- Conservation considered as a “side item”
- Water Assurance District stays in plan but cannot depend on it for all of water supply
- Acquisition of existing water rights always an option

Preliminary Screening of Alternatives



- Objective: eliminate infeasible options
- Goal: 7-10 alternatives to move forward
- Simple pass/fail analysis

Preliminary Screening Criteria



- **Related to the project objectives**
- **Five general criteria:**
 - **Optimizes existing resources**
 - Includes water rights, raw water infrastructure, treatment infrastructure
 - **Increases reliability during drought**
 - Includes increased reliability of existing sources and new sources that are independent of existing sources
 - **Minimizes implementation risk**
 - Includes effectiveness of alternative, public issues, historical use for water supply, permitting, approval, and development processes
 - **Expandable for future demands**
 - Includes availability for future water rights, physically expandable
 - **Cost effective**
 - Most bang for the buck
 - Capital costs only – does not include O&M costs
 - 30% contingencies for unknown work
 - 20% factor for engineering, legal, etc

Preliminary Screening Costs

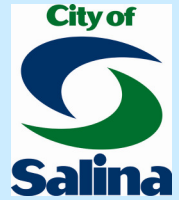


Alternative	Capacity (MGD)	Total Construction Cost	Other Costs	Total Project Costs	Cost/gal
Seasonal Water Right	10.00	\$4,235,000	\$847,000	\$5,082,000	\$0.51
Aquifer Recharge - Recharge Wells	5.00	\$6,512,000	\$1,302,000	\$7,814,000	\$1.56
Downtown Wellfield	3.00	\$5,317,000	\$1,063,000	\$6,380,000	\$2.13
Water Reuse City-owned irrigation	1.90	\$5,051,000	\$1,010,000	\$6,061,000	\$3.19
Water Reuse all irrigation	3.67	\$9,790,000	\$1,958,000	\$11,748,000	\$3.20
Water Reuse all industrial + irrigation	5.00	\$13,863,000	\$2,773,000	\$16,636,000	\$3.33
Acquire Existing Water Rights	5.00	\$16,857,000	\$3,371,000	\$20,228,000	\$4.05
South Wellfield	3.70	\$12,648,000	\$2,530,000	\$15,178,000	\$4.10
Milford Reservoir	5.00	\$25,649,000	\$5,130,000	\$30,779,000	\$6.16
Dakota Aquifer	5.00	\$26,008,000	\$5,202,000	\$31,210,000	\$6.24
Kanopolis Reservoir	2.00	\$11,701,000	\$2,340,000	\$14,041,000	\$7.02
Saline River	5.00	\$34,381,000	\$6,876,000	\$41,257,000	\$8.25
Confluence	5.00	\$38,662,000	\$7,732,000	\$46,394,000	\$9.28
Wilson Reservoir	5.00	\$58,738,500	\$11,748,000	\$70,486,500	\$14.10
Reservoir Constuction	5.00	\$135,350,800	\$27,070,000	\$162,420,800	\$32.48

Natural Breakpoint

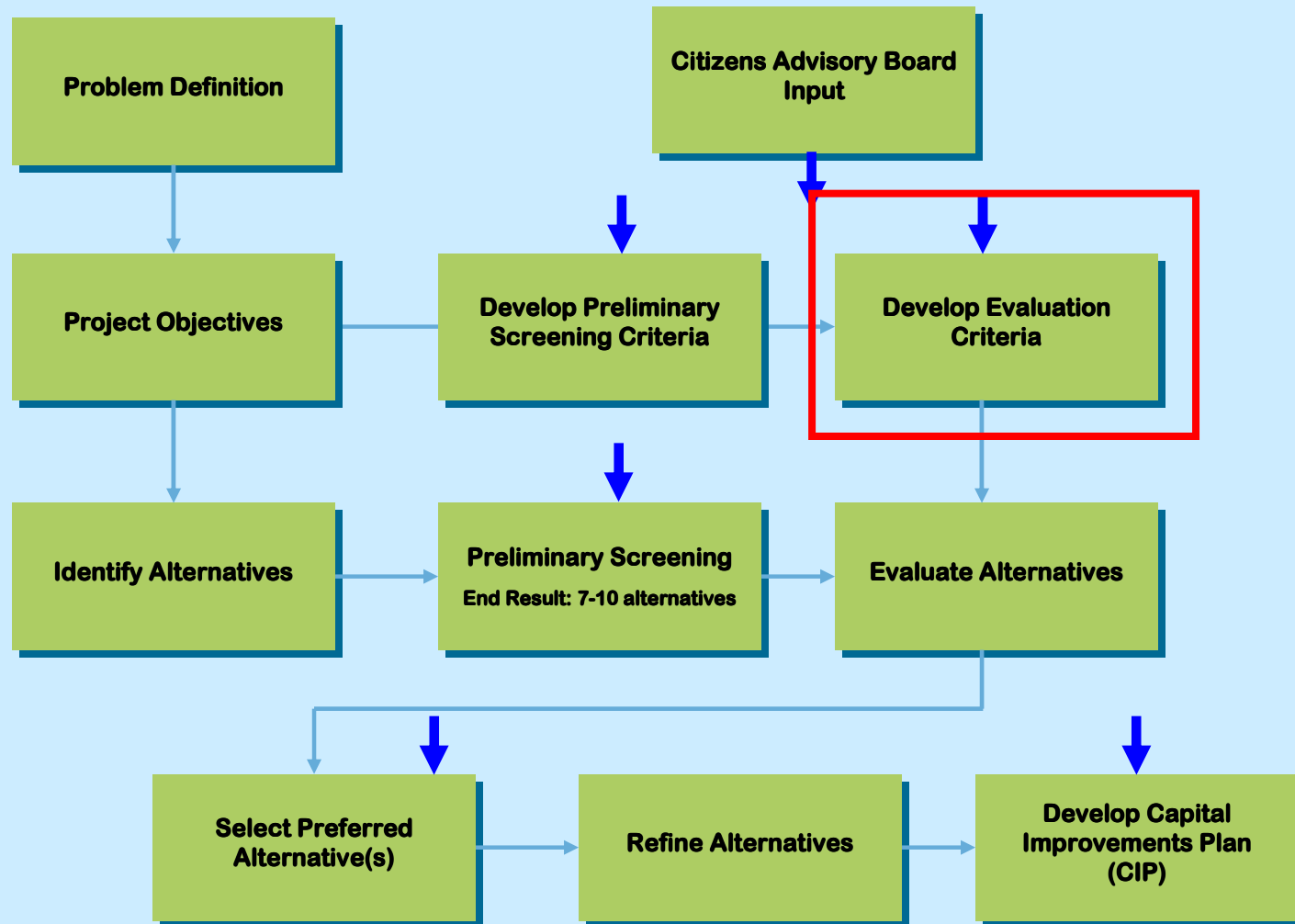
*Water Assurance District – costs unknown but assumed to be above the breakpoint line. Only cost is annual cost to purchase the storage.

Review of Preliminary Screening Results



Alternatives	Preliminary Screening Criteria - # Passing					Total # Passing Criteria
	Optimizes Existing Resources	Increases Reliability	Minimizes Implementation	Expandable for Future Demands	Cost Effective (above natural breakpoint)	
Improvements at South Wellfield		4			1	5
Obtain a seasonal surface water right		3.5			1	4.5
Improvements at Downtown Wellfield		2.5			1	3.5
Confluence of Smoky Hill and Solomon Rivers		2.5			1	3.5
Acquisition of existing water rights		2.5			1	3.5
Water reuse		2.5			1	3.5
Milford Reservoir		2			1	3
Dakota Aquifer		2			1	3
Saline River		1.5			1	2.5
Develop a water assurance district		1.5			1	2.5
Aquifer recharge		1			1	2
Kanopolis Reservoir		0.5			1	1.5
Construct a water supply reservoir		1.5			0	1.5
Wilson Reservoir		1			0	1

Alternatives Process



Pair Matrix Survey Results

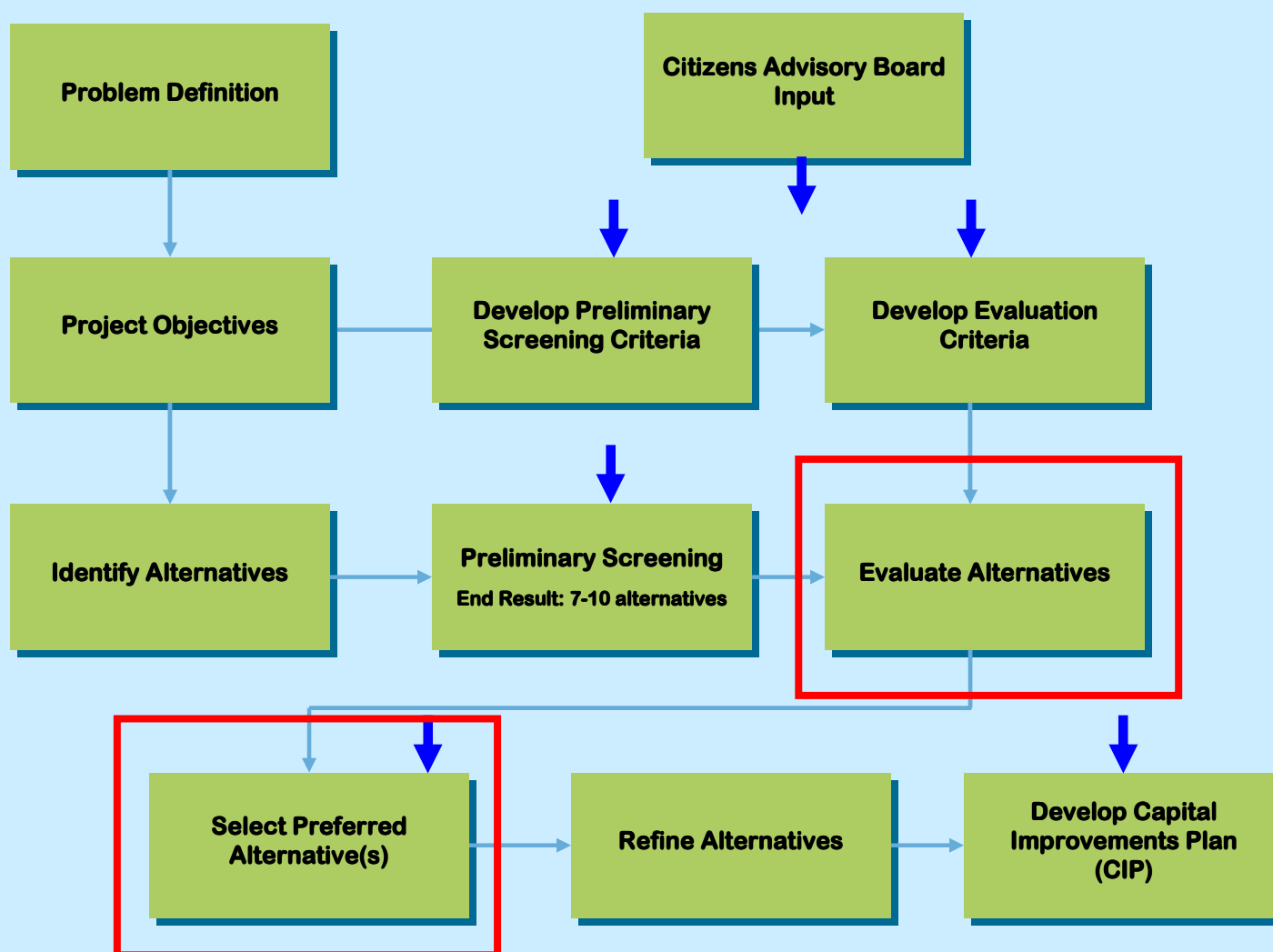


Evaluation Criteria	1 Optimizes existing infrastructure	2 Increases reliability during drought	3 Minimizes implementation risk	4 Expandable for future demands	5 Cost Effective	6 Implementation Time	7 Minimizes environmental impacts	8 Desirable water quality	9 Permitability	10 Sustainability	How many times did CAB select:
1 Optimizes existing infrastructure		1 vs 2	1 vs 3	1 vs 4	1 vs 5	1 vs 6	1 vs 7	1 vs 8	1 vs 9	1 vs 10	1 - 42
2 Increases reliability during drought			2 vs 3	2 vs 4	2 vs 5	2 vs 6	2 vs 7	2 vs 8	2 vs 9	2 vs 10	2 - 63
3 Minimizes implementation risk				3 vs 4	3 vs 5	3 vs 6	3 vs 7	3 vs 8	3 vs 9	3 vs 10	3 - 25
4 Expandable for future demands					4 vs 5	4 vs 6	4 vs 7	4 vs 8	4 vs 9	4 vs 10	4 - 54
5 Cost effective						5 vs 6	5 vs 7	5 vs 8	5 vs 9	5 vs 10	5 - 54
6 Implementation Time							6 vs 7	6 vs 8	6 vs 9	6 vs 10	6 - 20
7 Minimizes environmental impacts								7 vs 8	7 vs 9	7 vs 10	7 - 25
8 Desirable water quality									8 vs 9	8 vs 10	8 - 49
9 Permitability										9 vs 10	9 - 41
10 Sustainability											10 - 65

Pair Matrix Survey Results

Evaluation Criteria	How many times did you select:	Weighting Factor
Sustainability	10 - 65	14.8%
Increases reliability during drought	2 - 63	14.4%
Expandable for future demands	4 - 54	12.3%
Cost effective	5 - 54	12.3%
Desirable water quality	8 - 49	11.2%
Optimizes existing infrastructure	1 - 42	9.6%
Permitability	9 - 41	9.4%
Minimizes implementation risk	3 - 25	5.7%
Minimizes environmental impacts	7 - 25	5.7%
Implementation Time	6 - 20	4.6%

Alternatives Process



Alternative Evaluation

- **Used CAB weighting factors from paired matrix worksheet summary**
- **Used the ten selected evaluation criteria**
- **Each criterion had a separate discussion**
- **Each project was given a 1, 2 or 3 rating for each criterion**
 - **3 = Best**
 - **2 = Average**
 - **1 = Below Average**

Alternative Evaluation



Alternative Evaluation Criteria

1. Optimizes Existing Resources

High – 3 Points

- ✓ The alternative utilizes or makes more effective all of the following: existing water rights, water sources, and infrastructure.

Moderate – 2 Points

- ✓ The alternative utilizes or makes more effective one of the following: existing water rights, water sources, or infrastructure.

Low – 1 Point

- ✓ The alternative doesn't utilize any existing resources.

2. Increases Reliability During Drought

High – 3 Points

- ✓ The alternative will most likely be available during drought and is a different water source than currently utilized.

Moderate – 2 Points

- ✓ The alternative will most likely be available during drought but is from the same water source currently utilized.

Low – 1 Point

- ✓ The alternative most likely will not be available during drought.

3. Minimizes Implementation Risk (includes public acceptance)

High – 3 Points

- ✓ There are no risks involved with implementing this alternative. Public acceptance will not be an issue.

Moderate – 2 Points

- ✓ There is only maybe one risk involved with implementing this alternative but most likely this is a minor risk and can be easily mitigated. Public acceptance will not be an issue.

Low – 1 Point

- ✓ There is one major or more than one minor risk involved with implementing this alternative that may not be easily mitigated. Public acceptance could be an issue.

4. Expandable for Future Demand

High – 3 Points

- ✓ The alternative is easily expandable for future demand and there is adequate water available for future demand.

Moderate – 2 Points

- ✓ The alternative is expandable for future demand and there is limited water available for future demand.

Low – 1 Point

- ✓ The alternative is not expandable for future demand or there is not adequate water available for future demand.

5. Cost Effective

High – 3 Points

- ✓ The alternative has low capital and O&M costs (compared to the other alternatives). It is in the range of up to \$5/gallon.

Moderate – 2 Points

- ✓ The alternative has moderate capital and O&M costs (compared to the other alternatives). It is in the range of \$5/gallon to \$10/gallon.

Low – 1 Point

- ✓ The alternative has high capital and O&M costs (compared to the other alternatives). It is higher than \$10/gallon.

6. Time to Implement

High – 3 Points

- ✓ The time to design, permit, and construct this alternative is most likely up to a 3 year process.

Moderate – 2 Points

- ✓ The time to design, permit, and construct this alternative is most likely a 3-6 year process

Low – 1 Point

- ✓ The time to design, permit, and construct this alternative is most likely longer than a 6 year process.

7. Minimizes Environmental Impacts

High – 3 Points

- ✓ The alternative avoids or minimizes all potential environmental impacts. All environmental impacts can be easily mitigated.

Moderate – 2 Points

- ✓ The alternative avoids or minimizes most potential environmental impacts. Most of the environmental impacts can be mitigated.

Low – 1 Point

- ✓ The alternative will have a negative environmental impact that cannot be mitigated.

8. Desirable Water Quality

High – 3 Points

- ✓ The alternative will require no additional water treatment above what is currently provided at the existing water treatment facility.

Moderate – 2 Points

- ✓ The alternative will require additional conventional water treatment processes (i.e. softening or iron & manganese removal, etc.).

Low – 1 Point

- ✓ The alternative will require additional advanced water treatment process (i.e. reverse osmosis, ozone, etc.).

9. Permitability

High – 3 Points

- ✓ The alternative will require minor additional permitting/approval process (KDHE approval of plans and specifications is not included).

Moderate – 2 Points

- ✓ The alternative will require a number of minor permits that are normal in Kansas (i.e. water right acquisition, facility permitting, pilot testing, etc.).

Low – 1 Point

- ✓ The alternative will require major permitting/approval process (i.e. injection well, inter-basin transfer, etc.).

10. Sustainability

High – 3 Points

- ✓ The alternative will have the ability to optimize its benefits without diminishing the capacity for similar benefits in the future (i.e. the alternative will be able to supply water in 50 years.)

Moderate – 2 Points

- ✓ The alternative may have the ability to optimize its benefits without diminishing the capacity for similar benefits in the future (i.e. the alternative may be able to supply water in 50 years.)

Low – 1 Point

- ✓ The alternative will not have the ability to optimize its benefits without diminishing the capacity for similar benefits in the future (i.e. the alternative will not be able to supply water in 50 years.)

Alternatives Evaluation

- **Optimizes Existing Resources**

High – 3 Points

- ✓ The alternative utilizes or makes more effective all of the following: existing water rights, water sources, and infrastructure.

Moderate – 2 Points

- ✓ The alternative utilizes or makes more effective one of the following: existing water rights, water sources, or infrastructure.

Low – 1 Point

- ✓ The alternative doesn't utilize any existing water resources.

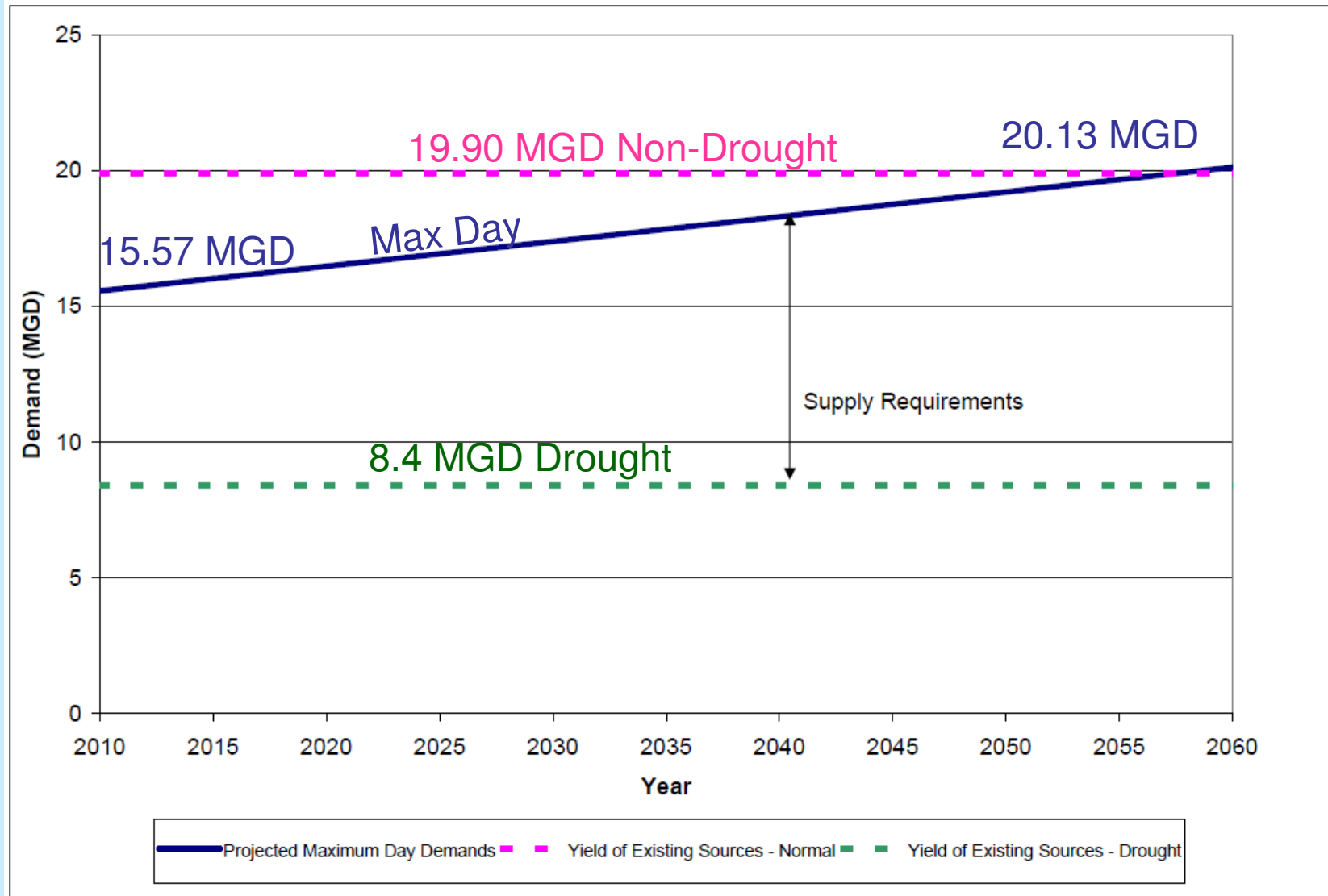
Alternatives Evaluation



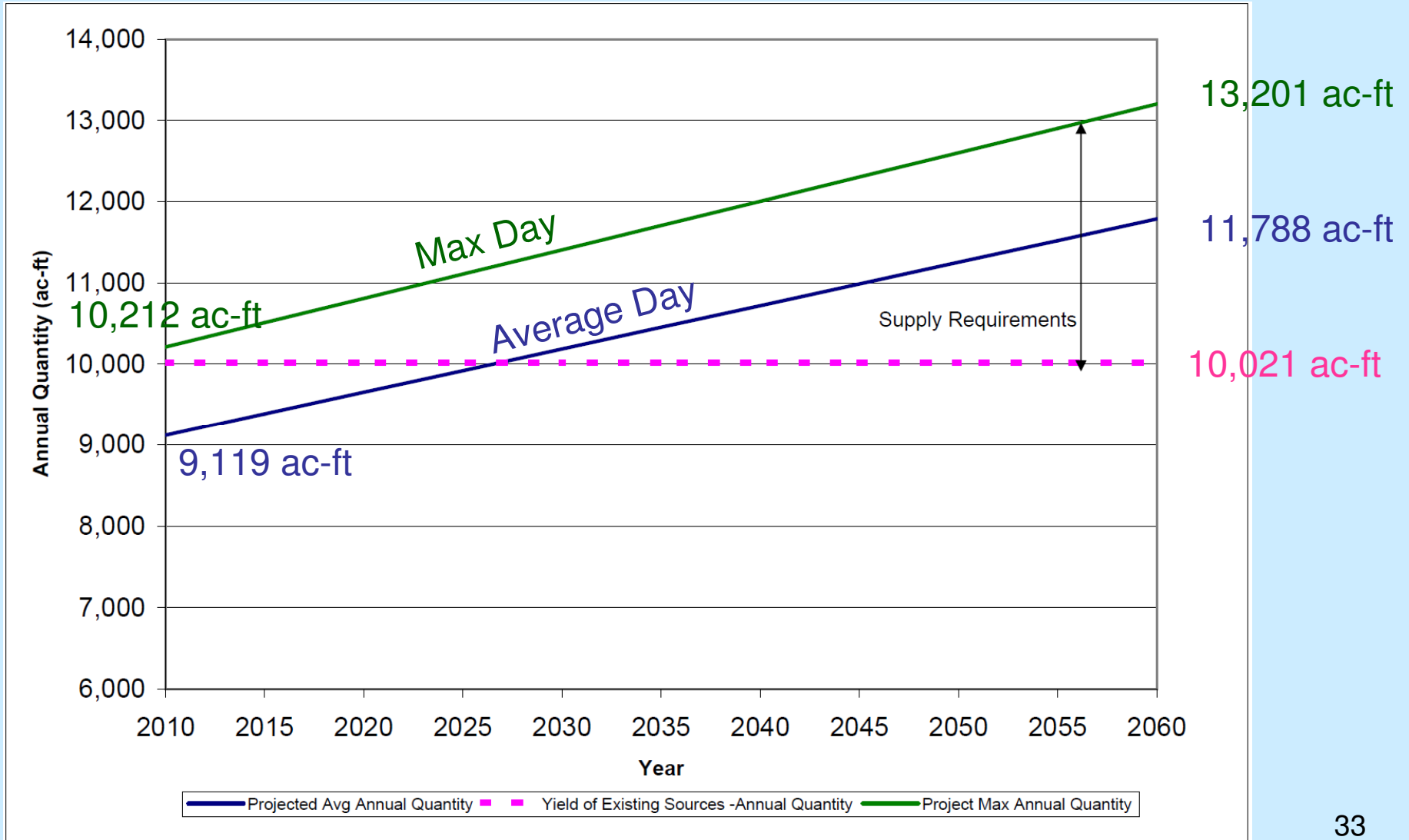
	Evaluation Criteria											Total Points
	Optimizes Existing Infrastructure	Increases Reliability during Droughts	Minimizes Implementation Risk	Expandable for Future Demands	Cost Effective	Implementation Time	Minimizes Environmental Impacts	Desirable Water Quality	Permitability	Sustainability		
Improvements at South Wellfield	3 X 9.6	3 X 14.4	3 X 5.7	2 X 12.3	3 X 12.3	3 X 4.6	3 X 5.7	2 X 11.2	2 X 9.4	3 X 14.8	267	
Improvements at Downtown Wellfield	3 X 9.6	2 X 14.4	3 X 5.7	1 X 12.3	3 X 12.3	3 X 4.6	3 X 5.7	3 X 11.2	3 X 9.4	3 X 14.8	261	
Obtain a Seasonal Surface Water Right	2 X 9.6	1 X 14.4	3 X 5.7	3 X 12.3	3 X 12.3	3 X 4.6	2 X 5.7	3 X 11.2	3 X 9.4	2 X 14.8	241	
Confluence of Smoky Hill and Solomon Rivers	1 X 9.6	3 X 14.4	2 X 5.7	3 X 12.3	2 X 12.3	2 X 4.6	2 X 5.7	1 X 11.2	2 X 9.4	3 X 14.8	221	
Dakota Aquifer	1 X 9.6	3 X 14.4	2 X 5.7	2 X 12.3	2 X 12.3	2 X 4.6	2 X 5.7	3 X 11.2	2 X 9.4	2 X 14.8	216	
Milford Reservoir	1 X 9.6	3 X 14.4	1 X 5.7	2 X 12.3	2 X 12.3	1 X 4.6	2 X 5.7	3 X 11.2	1 X 9.4	3 X 14.8	211	
Water Reuse - Alt 3	2 X 9.6	2 X 14.4	2 X 5.7	2 X 12.3	1 X 12.3	3 X 4.6	2 X 5.7	2 X 11.2	2 X 9.4	3 X 14.8	207	
Water Reuse - Alt 1	2 X 9.6	2 X 14.4	1 X 5.7	2 X 12.3	1 X 12.3	2 X 4.6	2 X 5.7	2 X 11.2	2 X 9.4	3 X 14.8	197	
Water Reuse - Alt 2	2 X 9.6	2 X 14.4	1 X 5.7	2 X 12.3	1 X 12.3	2 X 4.6	2 X 5.7	2 X 11.2	2 X 9.4	3 X 14.8	197	
Saline River	1 X 9.6	3 X 14.4	2 X 5.7	2 X 12.3	2 X 12.3	2 X 4.6	2 X 5.7	1 X 11.2	1 X 9.4	2 X 14.8	184	



Max Day Demand Deficit During a Drought



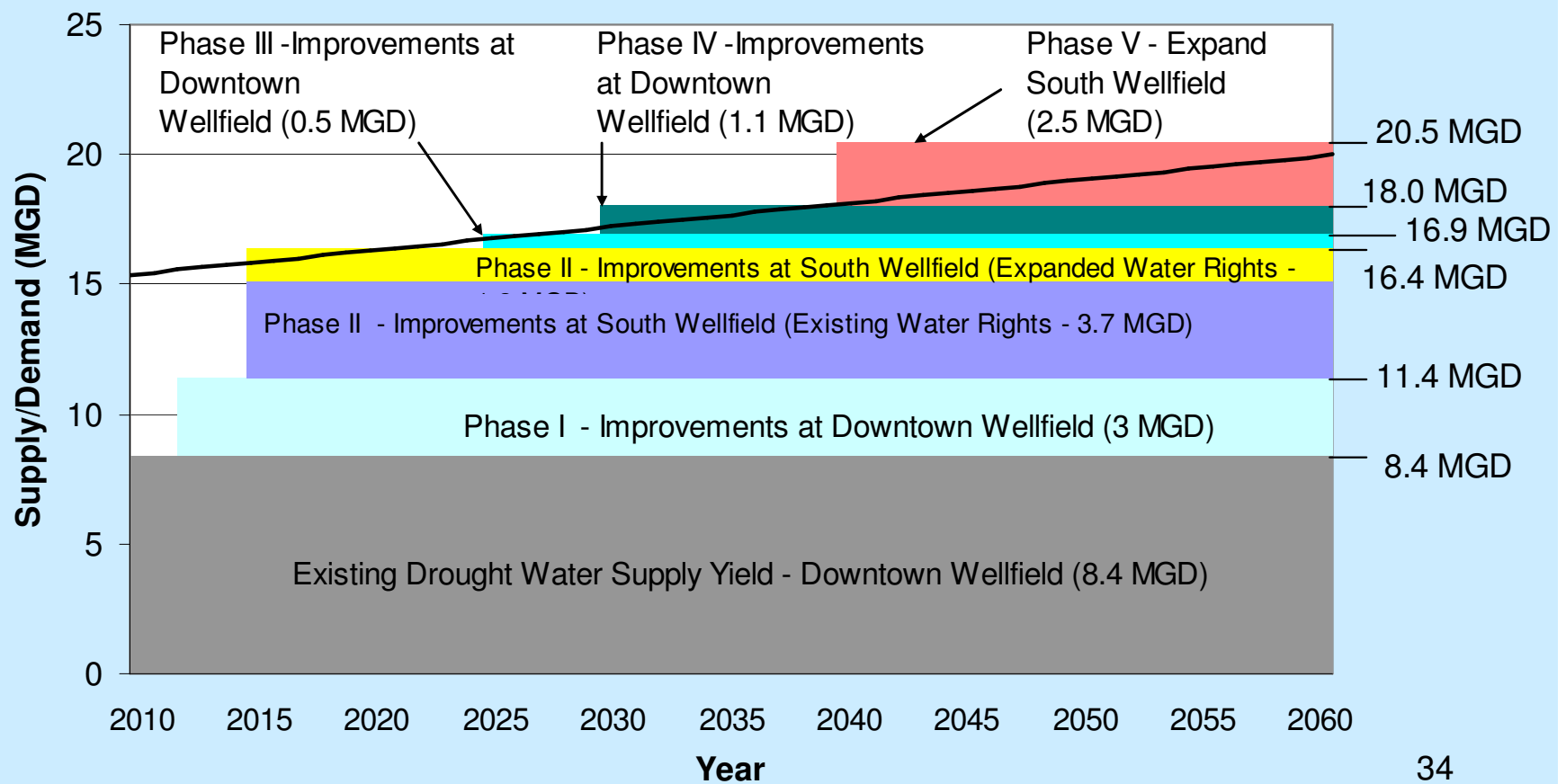
Max Day/Average Day Annual Demand Deficit



Additional Supply During a Drought



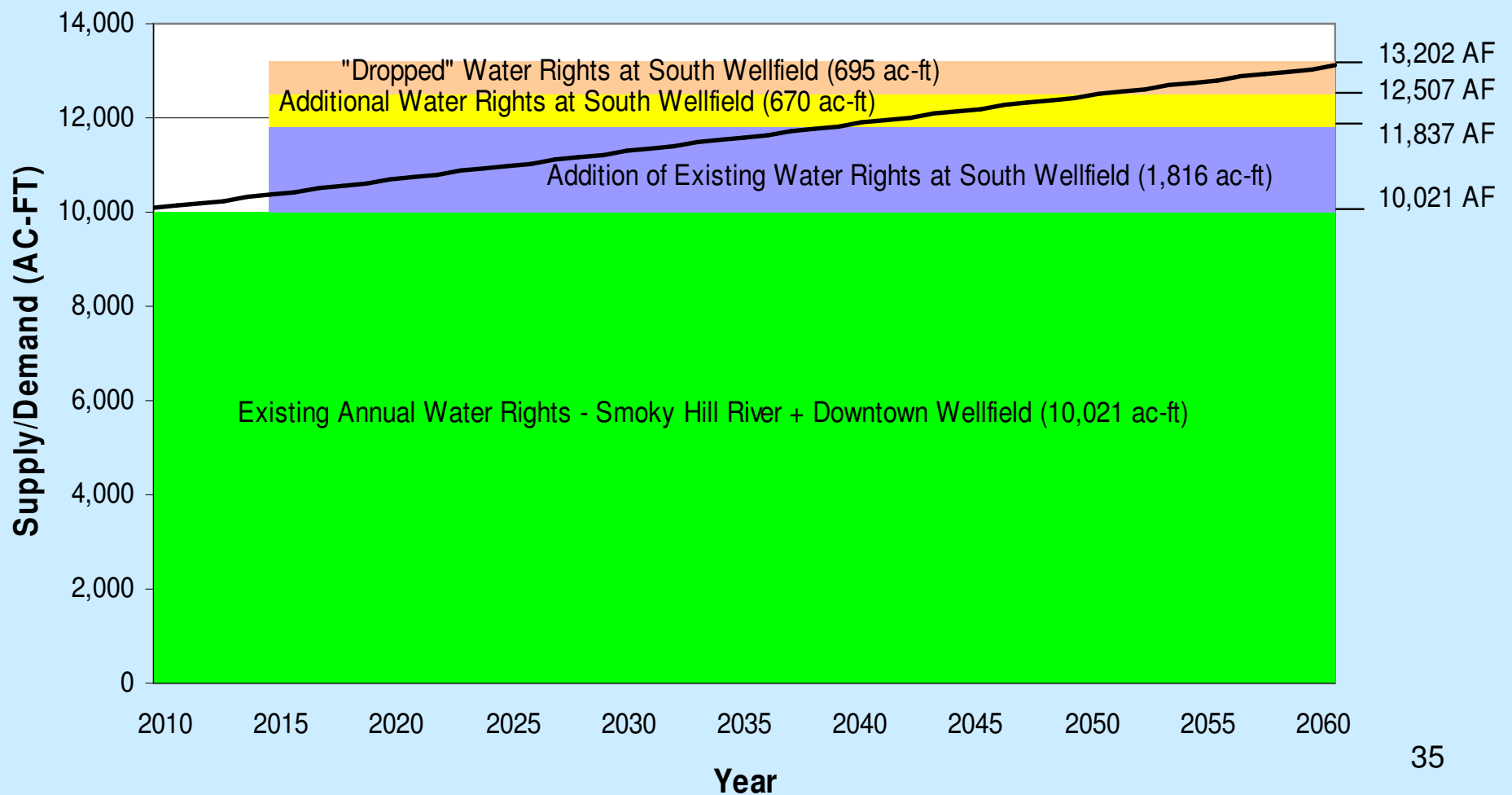
Capital Improvements Plan to Meet Maximum Day Demand Through 2060



Additional Annual Quantity



Capital Improvements Plan to Meet Annual Water Needs Through 2060



Capital Improvement Plan



Phase I - bring online by 2012 (\$3,170,000)

- Improvements at Downtown Wellfield for an additional 3 MGD
 - Re-drill 4 wells
- Wellfield piping improvements
- Retrofit of air stripping facilities at the existing water treatment plant

Work with KDHE to mitigate Downtown Wellfield contamination impacts

Assume KDHE has mitigated Downtown Wellfield contamination impacts

Capital Improvement Plan



Phase II - bring online by 2015 (\$23,180,000)

- **Improvements at South Wellfield for an additional 5 MGD**
 - Demolition of existing Schilling Water Treatment Plant
 - Addition of a 5 MGD groundwater treatment facility expandable to 7.5 MGD with 1 MG of finished water storage
 - 2 observation wells
 - Piping improvements
 - Re-drill 5 existing wells (3.7 MGD)
- **Try to obtain new water rights for a minimum of 3.8 MGD for the South Wellfield (this would provide for your future 2.5 MGD expansion)**
- **Have DWR correct limitation that was placed on Vested SA035 and reiterated in 31636 (Currently 11,837 ac-ft). This will allow the full water right usage of 2,511 ac-ft to be used at South Wellfield (Proposed revised water rights 12,532 ac-ft).**
- **At a minimum obtain 1.3 MGD and 670 acre-feet of water rights and drill 3 new wells (assume 500 gpm per well). Proposed total water rights 13,202 ac-ft**

Capital Improvement Plan



Phase III – bring online by 2025 (\$975,000)

- Improvements at Downtown Wellfield for an additional 0.5 MGD
 - Re-drill 2 wells

Phase IV – bring online by 2030 (\$486,000)

- Improvements at Downtown Wellfield for an additional 1.1 MGD
 - Re-drill one well

Phase V – bring online by 2040 (\$9,943,000/\$18,100,000)

- Improvements at South Wellfield for an additional 2.5 MGD
 - If not obtained through previous negotiations, negotiate or purchase an additional 2.5 MGD of water rights and drill 4 new wells (assume 500 gpm per well) and upgrade Water Treatment Plant from 5.0 MGD to 7.5 MGD and add 1 MG of finished storage
 - Piping improvements

QUESTIONS?

**Thanks for attending,
if you wish to contact me
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